

# AUTOMATIC SPEED CONTROL SYSTEM FOR VEHICLES USING COLOR AND HALL SENSORS

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**Abstract** - Speed control system is the most important necessity in today's world. According to World Health Organization, road accidents caused an estimated 1.25 million death worldwide in the year 2010. That is, one person is killed every 25 seconds. This is due to lack of speed control and violating the traffic rules. This loss can be prevented by taking improved measures regarding traffic rules, vehicle safety and rash driving. An improved system is needed to control the speed of vehicle as the existing techniques are not efficient. This paper proposes an advanced system to control the vehicle speed using the color and hall sensor. The methodology explains that particular roads are needed to be painted with specific colors i.e. red, green or blue. And a definite speed is assigned to each color. The color sensors are attached at the lower surface of the vehicle & hall sensors are used near the wheels to detect the speed of the vehicle. In actual practice, as the particular color strip is detected by the color sensor, the system gets activated. Then the speed of the vehicle is changed to a specific threshold speed, assigned to that particular color. This system restricts the speed to increase beyond the specified speed limit, reduces the probability of road accidents and gives driving comfort to the driver.

**Key Words:** Color & hall sensor, Hall Effect, microcontroller, limitation of speed, color strips painted on roads.

## 1. INTRODUCTION

Research has shown that there are a lots of system which partially or fully control the speed of the vehicle. But many of them are still in progress as they are not feasible to implement. Others are too developing in coming years. The main causes of road accidents are rash driving, drunk driving, system failure, collision due to obstacles, existing speed control limit etc. A lot of rules are implemented by the government such as helmet and seat belt compulsion etc. But there is no efficient speed control system which

can prevent road accidents. That's why there is a need of such system that control speed with respect to particular road types. Due to this proposed method the problems related to rash driving and collisions will be reduced. Now it is possible to set up a system having different speed limits for different color strips on roads. In India, the speed limits for high ways and expressways are 60-80km/hr and 120-130km/hr respectively. But also, there are some speed restricted zones like schools, hospitals, dangerous curves, etc where speed shouldn't be beyond 30km/hr. The key design component of this method is the color strips with which the roads are to be painted, the color sensors located below the bumper of chassis which recognize the color of the road and the hall sensor which detects the speed of the vehicle.

## 2. LITERATURE SURVEY

Several road safety articles and literature databases were searched but very few information was available regarding speed control system. As much till now, not lot of work is carried out in this area. Numerous articles were found related to the present road conditions and urgent need of safety measures. Various studies are being carried out but the documentation is not yet done. Also the implementation of various proposed methods is not feasible.

## 3. METHODOLOGY

Many accidents occur due to rash driving, poor judgment of driver or poor driving by the driver. Also particular speed limits are assigned to specific roads but very few drivers follow that. Hence smart speed control systems are to be used to automatically limit the speed of the vehicle. Coming to the implementation part a lot of components are needed such as microcontroller, color & hall sensors, magnet etc.

### 3.1 Microcontroller

Any controller compatible with color and hall sensor can be used. The main point to remember while choosing the controller is, it should not increase the complexity & reliable regarding power supply, interfacing and training the system should be easy. Also, latest controller can be used such as arduino uno or raspberry pi, as they have a lot of features and are more efficient.

### 3.2 Sensors

Sensors are used to assimilate the information from the operation or processes being performed. These sensors convert the physical stimulus into an electrical signal that is further analyzed by the system and used for taking decisions. Sensors also have the feature of self monitoring of the system. The two main sensors used are color sensor and hall sensor.

**3.2.1 Color sensor-** There are different types of color sensors. Based on the programming it is trained to detect one or more color. Mainly three colors are detected that are red, green and blue. Different color sensors use different methods to detect the color i.e., some detect the color based of pixel values whereas others use the frequency obtained from conversion of light reflected from each color. Also the results vary with the combination of the colors. Hence, an efficient color sensor based on application has to be chosen.

**3.2.2 Hall sensor-** It is used to calculate the speed of the vehicle (in rpm). It works on the principle of Hall Effect. When a magnet is attached to the moving wheel of the vehicle, it creates a magnetic field, that helps the hall sensor to detect this field & to give output pulse per revolution of the wheel. The hall sensor has a hall element and a differential amplifier. The amplifier has special characteristics. The hall element produces very low hall voltage down in micro volts. Therefore the amplifier must have very low noise, high input impedence to detect the hall voltage and amplify it.

### 4. Working

Initially, the color sensor located below the bumper on chassis, recognizes the color of the road to get the system activated. The hall sensor calculates the speed of the vehicle in rpm & display it on LCD. The system compares the actual speed of the vehicle with the specific speed assigned to detected color. If the value is not same, then

the vehicle is restricted to the particular threshold speed. This system, limit the speed of the vehicle to increase beyond the specified limit. Therefore, by using this topology the speed limit for various zones can be set.

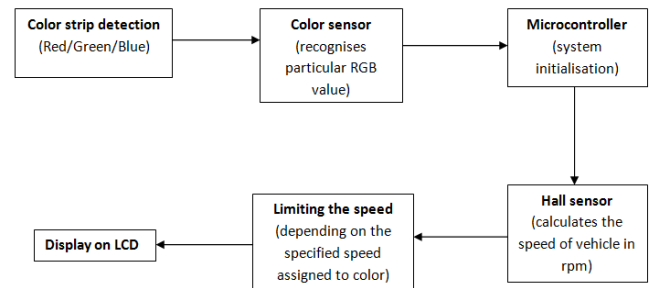


Fig -1: Block diagram of complete proposed system

### 3. CONCLUSIONS

The paper represents an automatic speed control system that limits the speed of the vehicle depending on specific road tracks. This approach is very much useful, as it will reduce the probability of road accidents and also the death due to accidents. As majority of road accidents are due to rash driving or poor judgment of driver. During our experiment the color detection was done properly and efficiently by color sensor. Also, hall sensor calculated the speed of the vehicle using principle of Hall Effect and further specific speed was assigned according to the type of color painted on the road. Also the implementation and future development of the system is feasible.

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